

82430TX PCIset

5BTXB-E

ISA PCI MainBoard

with Onboard PCI IDE and Super Multi-I/O.

TRADEMARK

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The specification is subject to change without notice.

V011

Package Checklist

**Please check your package which should include all items listed below.
If you find any item damaged or missed, please contact your supplier.**

- One Mainboard
- One manual
- One IDE ribbon cable
- One floppy ribbon cable
- One Parallel port ribbon cable
- One Serial port ribbon cable(COM1, COM2)

Contents

	page
Chapter 1 - Introduction	1-1
System Block Diagram	1-3
Chapter 2 - Hardware Design	2-1
2-1 Overview	2-1
5BTXB-ELayout	2-2
2-2 Connectors and Jumpers	2-3
2-3 System Memory Configuration	2-6
2-4 Integrated PCI Bridge	2-9
Chapter 3 - ATX Power Connector	3-2
3-1 External Modem Ring-in Power-On	3-2
Chapter 4 - Award BIOS Setup	4-1
4-1 Standard CMOS Setup	4-2
4-2 BIOS Features Setup	4-2
4-3 Chipset Features Setup	4-6
4-4 Power Management Setup	4-8
4-5 Plug & Play/PCI Configuration	4-11
4-6 Integrated Peripherals	4-14
4-7 Load Setup Defaults	4-16
4-8 Change Supervisor or User Password	4-17
4-9 IDE HDD Auto Detection	4-18
4-10 HDD Low Level Format	4-20
4-11 Save & Exit Setup	4-20
4-12 Exit Without Saving	4-20
Chapter 5 - Technical Information	5-1
5-1 I/O & Memory Map	5-1
5-2 Time & DMA Channels Map	5-2
5-3 Interrupt Map	5-2
5-4 RTC & CMOS RAM Map	5-3
Appendix A: POST Codes	5-4
Appendix B: I/O Connectors	5-8

NOTE :

The "LOAD SETUP DEFAULTS" function loads the system default data directly from ROM and initializes the associated hardware properly. This function is necessary when you accept this motherboard, or the system CMOS data will corrupt.

ROM PC/ISA BIOS CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	SUPERVISOR PASSWORD
BIOS FEATURES SETUP	USER PASSWORD
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT SETUP	HDD LOW LEVEL FORMAT
PNP/PCI CONFIGURATION	LOAD SETUP DEFAULTS
INTEGRATED PERIPHERALS	SAVE & EXIT SETUP
Load SETUP Default (Y/N)? Y	
ESC: QUIT ↑ ↓ → ← : SELECT ITEM	
F10: Save & Exit Setup (Shift)F2 : Change Color	
Load Setup Defaults Except Standard CMOS SETUP	

LOAD SETUP DEFAULT

Chapter 1

Introduction

The **SBTXB-E** mainboard is a high performance system hardware based on Intel Pentium® processor and is equipped with four PCI slots, three standard ISA slots, a PnP Super I/O controller and two dual-port PCI-IDE connectors for the future expansion. The hardware dimension is an AT form-factor that is 220mm x 220mm with a four-layer design technology.

Specification

- Intel 82430TX PCIset chipset.
- Intel Pentium® Processor operating at 90 ~ 333 MHz (Easy CPU CLK Setting JP3 : One Jumper Only) and P55C with 321 ZIF socket 7 for scalability to accept faster processors in the future.
- Supports an onboard Switching Voltage Regulator to increase CPU and System's reliability.
- Supports CPU Vcore Voltage 2.1V/2.5V/2.8V/2.9V/3.2V selection.
- Supports up to 256 MegaBytes of DRAM (a minimum of 8 MB) on board (72-Pin SIMM x 2, 168-Pin DIMM x 2). BIOS auto FP DRAM, EDO DRAM and SDRAM configuration (Refer to Chapter 2-4 System Memory Configuration)
- Supports Onboard Pipelined burst synchronous L2 **Write Back** Cache. The cache size is 512KB (64KB*64 SRAM).
- Supports three 16-bit ISA slots and four 32-bit PCI slots and provides two independent high performance PCI IDE interfaces capable of supporting **PIO Mode 3 and Mode 4** devices.
- Supports **ATAPI** (e.g. **CD-ROM**) devices and Ultra DMA 33 for both IDE interface.
- Supports 1 floppy port, 1 parallel port (EPP/ECP port), and 2 serial ports (16550 Fast UART compatible) with PnP Super I/O chip.
- Supports both PS/2 style mouse header and AT style keyboard connector.
- Supports Award Plug & Play BIOS. The BIOS is stored in Flash EPROM form. It provides better upgradeability for the system.
- Supports a CPU Hardware sleep and SMM (System Management Mode) function.
- Supports a PWR/ON connector with an ATX power supply for a Remote ON/OFF and a Ring-in (External Modem only) Power-On function.

- Supports a USB header
- Utilizes a Lithium battery which provides environmental protection and longer life-time
- Supports a dual-button configuration which consists of POWER button for Off/On transitions and SLEEP button for Sleep/Wake transitions. The configuration is for ACPI-defined 4-second override feature of the SLEEP button. When the user presses the power button for less than 4 seconds, the system enters into sleep mode. When the user presses the power button for more than 4 seconds, the system is powered off while the board utilizes an ATX power supply.
- Supports onboard ATX and AT power connectors.

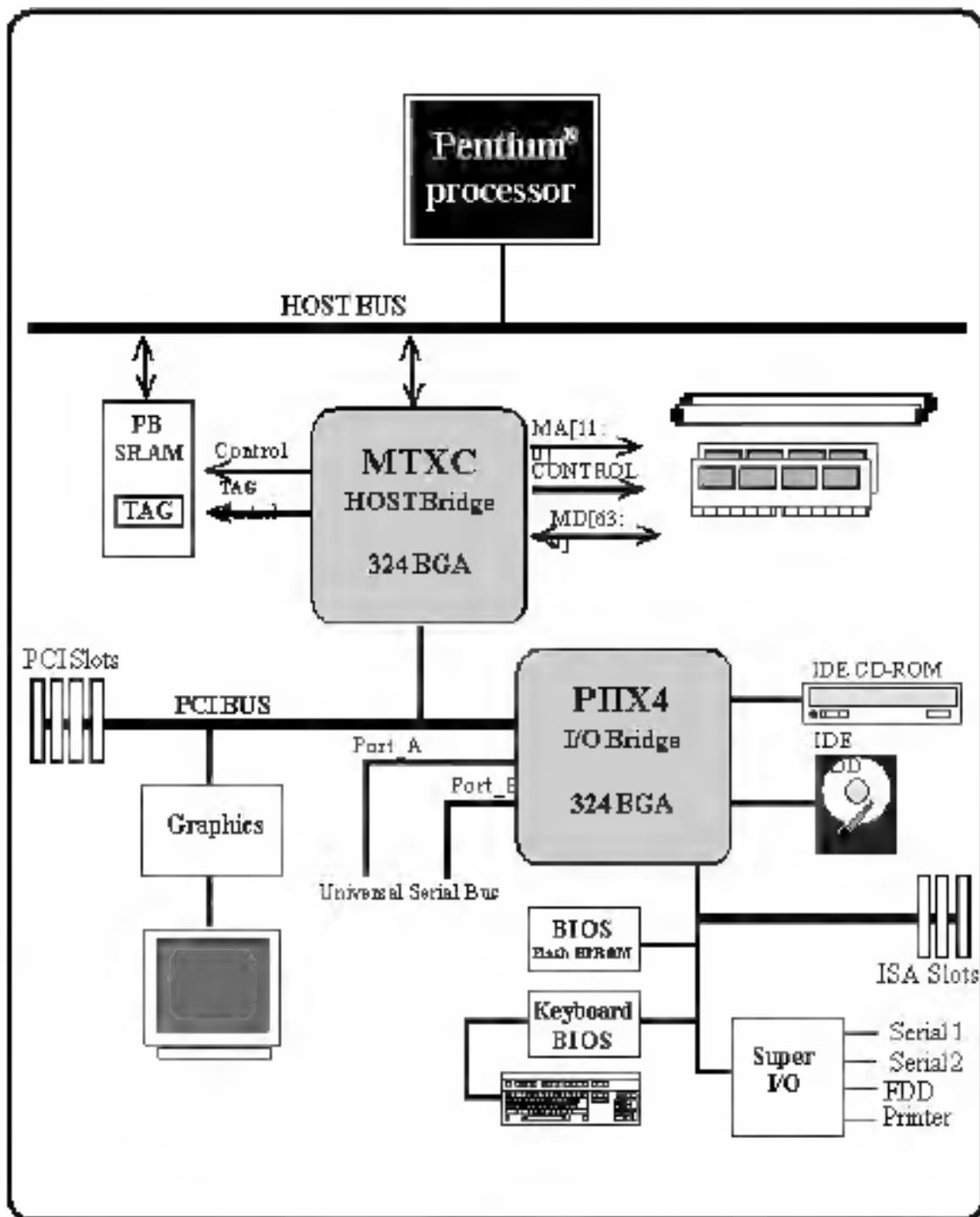


Figure 1-2 System Block Diagram

Chapter 2

Hardware design

2-1 Overview

The SBTXB-E is designed with Intel 82430TX PCIset chipset which is developed by INTEL Corporation to fully support Pentium® Processor PCMTSA system. The Intel 82430TX PCIset chipset can increase integration and improve performance designs. The chipset provides an integrated IDE controller with two high performance IDE interfaces for up to four IDE devices (hard devices, CD-ROM device, etc). The PnP Super I/O controller provides the standard PC I/O functions: a floppy interface, two 16 Byte FIFO serial ports and an EPP/ECP capable parallel port. The **SBTXB-E** layout is shown in the next page for user's reference. Care must be taken when inserting memory modules, inserting CPU or even plugging PCI card into the associated slots to avoid damaging any circuits or sockets on board. A cooling fan is strongly recommended when installing P54C/P54CTB/P55C (MMX)/K5/K6/6x86 (6x86L)/6x86M/C processor due to possible overheating.

The SBTXB-E supports a minimum of 8MB of System Memory and a maximum of 256MB with 512KB synchronous SRAM Onboard to increase system performance.

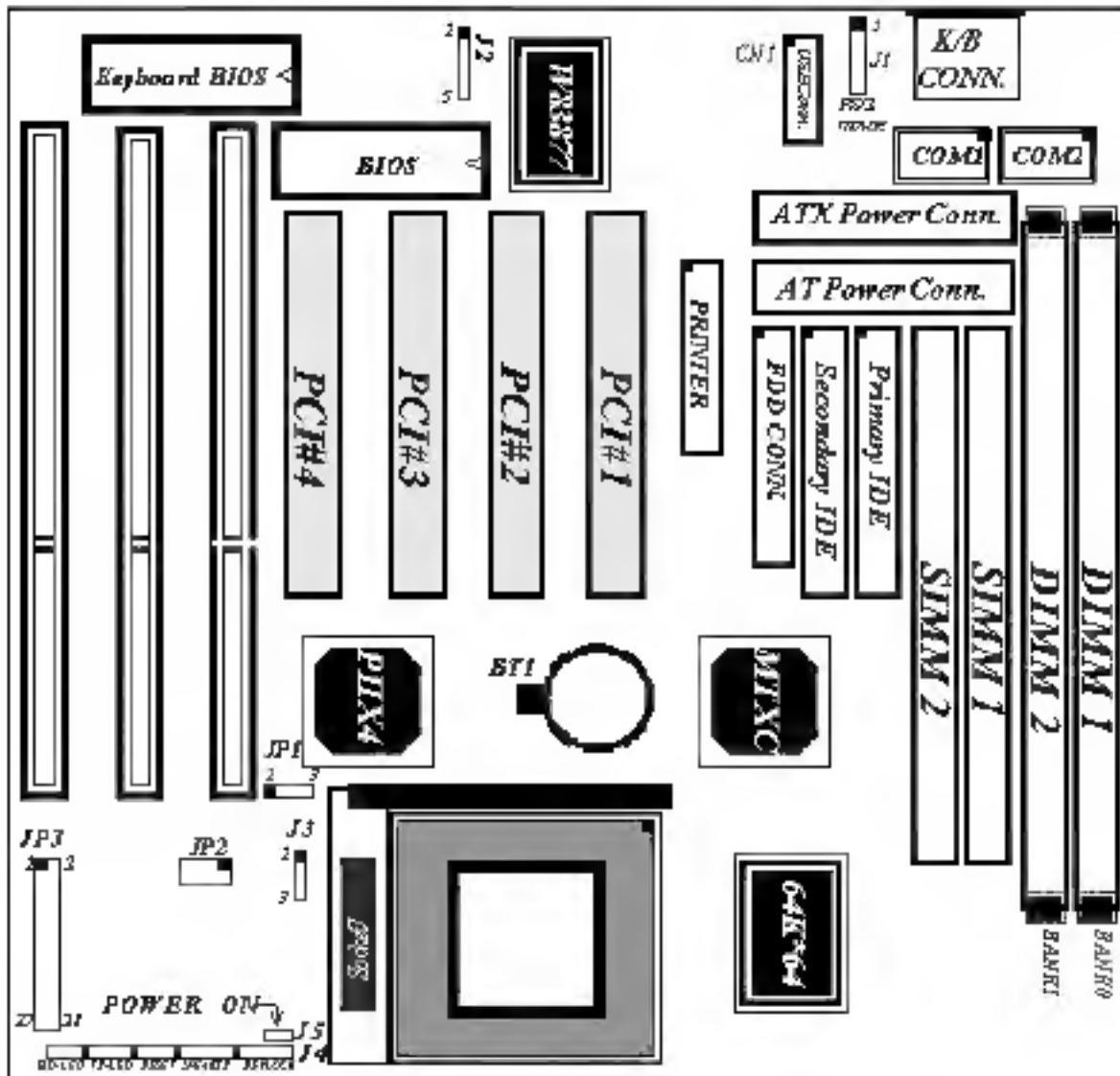
The SBTXB-E supports standard Fast Page, EDO (Extended Data Out or Hyper Page Mode) or synchronous DRAM. **The SBTXB-E** provides two 72-pin SIMM and two 168-pin DIMM sites for memory expansion. Each SIMM socket supports 8MB, 16MB, 32MB and 64MB single-sided or double-sided memory modules. The memory timing requires 70 ns for Fast page devices or 60 ns for EDO DRAM. This mainboard has two 168-pin DIMM sites to support 3.3V (power level) Unbuffered Synchronous DRAMs (SDRAM). Each DIMM Socket Supports 8MB, 16MB, 32MB, 64MB and 128MB Single-Sided or double-Sided SDRAM. **Memory parity generation and checking are not supported.** (DRAM Modules may be parity[x 36] or non-parity[x 32].

The SBTXB-E supports two Onboard PCI IDE connectors that can support PIO Mode/Ultra DMA 33 device and detect IDE harddisk type by BIOS utility automatically.

The SBTXB-E supports Award Plug & Play BIOS for the ISA and PCI cards. The BIOS can be located in Flash EPROM. The advantage of having Flash EPROM is much easier to replace BIOS code if necessary.

The SBTXB-E has been designed with AT form-factor with ATX/AT power connector. The system block diagram and mainboard layout are shown in Figure 1-2 and Figure 2-1.





5BTXB-E Layout



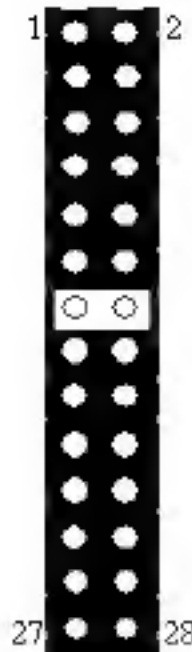
Note : ■ Means Pin 1

Figure 2-1

2-2 Connectors and Jumpers

This section describes all of the connectors and jumpers equipped in the mainboard. Please refer to **Figure 2-1** for the location of each connector and jumper. The figure  in the following means connecting pin 1&2 and  means connecting pin 2&3. Jumpers with two pins are shown as  for open and  for close.

JP3: CPU Clock Rate Select. (Easy-Setting-Single-Jumper)

JP3		Pentium Pentium MMX AMD K5 / K6	Bus Frequency x Multiplier	Cyrix 6x86(L) / 6x86MX IBM 6x86(L) / 6x86MX
	1-2	90MHz	60MHz x 1.5	
	3-4	100MHz	66MHz x 1.5	
	5-6	120MHz	60MHz x 2	6x86/L-PR150
	7-8	133MHz	66MHz x 2	6x86/L/MX-PR166
	9-10		75MHz x 2	6x86/L/MX-PR200
	11-12	150MHz	60MHz x 2.5	6x86MX-PR166
	13-14	166MHz	66MHz x 2.5	6x86MX-PR200
	15-16	188MHz	75MHz x 2.5	* 6x86MX-PR233
	17-18	200MHz	66MHz x 3	* 6x86MX-PR233
	19-20	225MHz	75MHz x 3	* 6x86MX-PR266
	21-22	233MHz	66MHz x 3.5	* 6x86MX-PR266
	23-24	* 266MHz	66MHz x 4	
	25-26	* 300MHz	66MHz x 4.5	
	27-28	* 333MHz	66MHz x 5	

* These jumper settings are reserved for the future CPU versions. When the future CPU versions are ready and suitable for this mainboard, these jumper settings will be correctly updated.

JP2 CPU Vcore voltage selection for Pentium MMX / AMD K6 / Cyrix

J2 1 LDATA SKIR CONNECTOR

1 VCC
2 NC
3 IIRX
4 GND
5 IIRTX

J3 The Power Supply (+12V) of the CPU Cooling FAN

1 GND
2 +12V
3 GND


J4 KeyLock Keyboard lock switch & Power LED connector

1 PowerLED+ The power LED lights when
the system is powered on
and blinks in SLEEP MODE
Suspend mode
2 N/C
3 GND
4 Keylock
5 GND


Speaker connect to the system's speaker for beeping.

7 Speaker
8 N/C
9 GND
10 VCC

Reset Close to restart system.**Turbo LED indicator** LED ON when a higher speed is selected.**Harddisk LED indicator** LED ON when Onboard PCI IDE Harddisks activates.

- J5**  **System Power ON/OFF Switch (For ATX Power Supply Connector)**
 Pressing the button once will switch the system on and enter the SLEEP MODE. (Suspend mode) While in the SLEEP MODE, a keystroke
 or mouse movement (mouse driver exists) will instantly 'wake up' the
 system. Pressing the button while the system is on for more than 4
 seconds will turn the system off.

Note The button should be a momentary switch that is normally open.

- JP1**  **Clear CMOS:**
 1 2 Normal operation (Default)
 2 3 Clear CMOS Values
 This setting allows users to clear current CMOS data to back to default by setting the jumper to 2 3 when system is off. This jumper should be brought back to pin 1 2 to restore the normal operation. Here we strongly recommend you pull out the power cable for safety and from damage before clearing CMOS data.

2-3 System Memory Configuration

The SBTXB-E supports different types of settings for the system memory. There is not jumper for SDRAM hardware setting needed for memory configuration. The following figures show all possible memory combinations.



Memory Configuration Table

DIMM1 (M1) (BANK 0)	DIMM2 (M2) (BANK 1)	SIMM1, SIMM2 (BANK 2)	TOTAL Memory MAX. = 256MB
SDRAM 8MB, 16MB [32MB] x 2	SDRAM 8MB, 16MB [32MB] x 2	EDO/FP DRAM [8MB, 16MB] [32MB, 64MB] x 2	=
[64MB, 128MB] x 2	[64MB, 128MB] x 2	Empty	-

NOTE:

1. SBTXB-E supports both Fast Page DRAM and EDO DRAM SIMMs, however they cannot be mixed in the same memory bank.
2. DIMM module specification is 3.3V unbuffered.

DIMM Module Installation

Figure 2-2 displays the notch marks and what they should look like on your DIMM memory module.

DIMMs have 68-pins and two notches that will match with the onboard DIMM socket. DIMM modules are installed by placing the chip firmly into the socket at a 90 degree angle and pressing straight down (figure 2-3) until it fits tightly into the DIMM socket (figure 2-4).

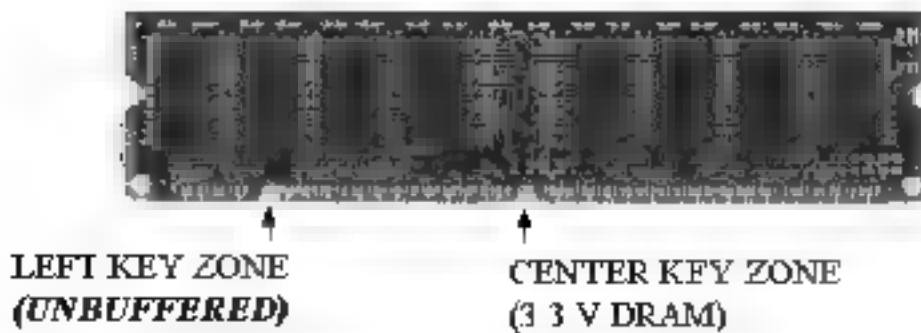


Figure 2.2

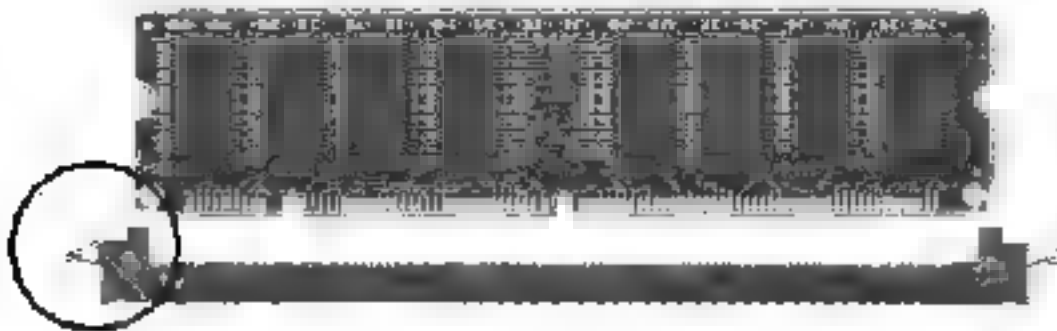


Figure 2.3

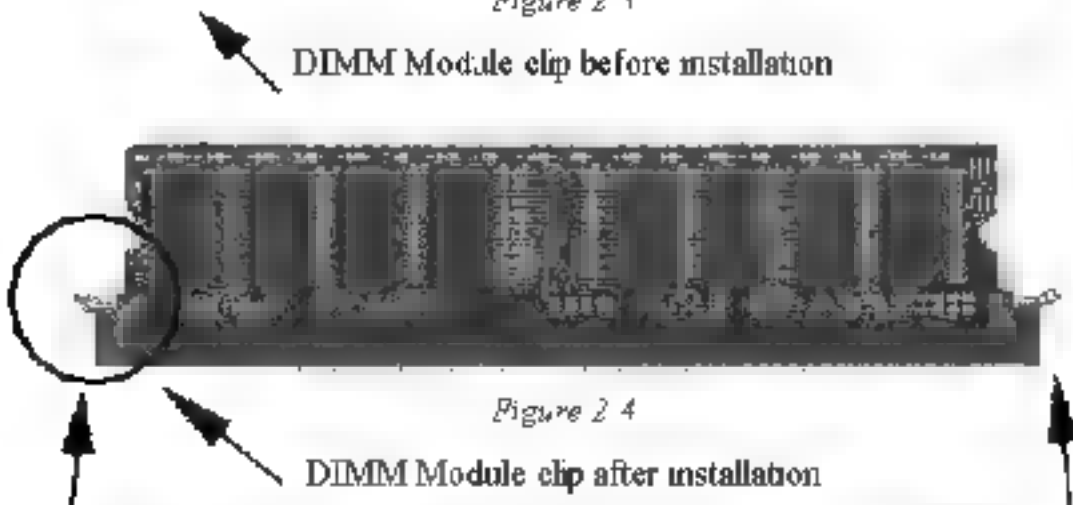


Figure 2.4

To remove the DIMM module simply press down both of the white clips on either side and the module will be released from the socket

When you have a DIMM module to plug into a 168-pin dual in-line connector you must make sure that the DIMM module is 3.3V/Unbuffered to support Intel Pentium[®] Processor System

- * VBTMB-E Supports and extends many memory configurations on its 2 SDRAM and 2 DIMM sites. The memory size of any configuration can be combined flexibly. BIOS will detect your memory configurations and sizes automatically.
- * The 70ns Fast Page Mode or 60ns EDO is necessary.
- * DIMM SDRAM MAX BF 83MHz(1.2ns) , 100MHz(1.0ns) or 20MHz(8ns) bus speed.
- * "BANK" = 64Bit = SDRAM1, SDRAM2 = DIMM1 = DIMM2

2-4 Integrated PCI Bridge

The **SBTXB-E** utilizes **Intel 430TX** PCIset chipset to support **Intel Pentium®** Processor **PCI/ISA** system. The **Intel 82430TX** PCIset chipset consists of one **82439TX** system controller (**MTXC**) and one **82371AB** **PCI/ISA/IDE** Accelerator (**PIIX4**) bridge chip. It provides an interface which translates CPU cycle into PCI bus cycle and PCI burst read/write capability. In addition, it provides a high performance PCI arbiter and supports four PCI Masters Rotating Priority Mechanism and Hidden Arbitration Scheme. Minimizes Arbitration Overhead. The **82371AB(PIIX4)** supports PCI Specification Revision 2.1 Compliant and contains a Universal Serial Bus interface with both host and hub control functions. **SBTXB-E** reserves a USB header to provide two USB ports for serial transfer at 12 or 1.5 Mbit/sec. Thus supports legacy keyboard and mouse software with USB-Base Keyboard and mouse.

There are four interrupts in each PCI slot: **INTA#**, **INTB#**, **INTC#**, and **INTD#**, since the **SBTXB-E** adapts the PCI auto-configuration with the system BIOS Setup utility. When the system is turned on after adding a PCI add-in card, the BIOS automatically configure interrupts, DMA channels, I/O space, and other parameters. You do not have to configure jumpers or worry about potential resource conflicts. Because PCI cards use the same interrupt resource as ISA cards, you must specify the interrupts used by ISA add-in cards in the BIOS Setup utility.

If a "Legacy card" such as plug paddle card and cable for the ISA slot is plugged in the system, modification in the **ROM SETUP UTILITY** becomes necessary. First, enter **PCI CONFIGURATION SETUP** utility from **ROM SETUP UTILITY** main menu to set the "**PCI IDE IRQ MAP TO ISA**".

Second, you must enter **CHIPSET FEATURES SETUP UTILITY** from **ROM SETUP UTILITY** main menu and set the "**Onboard Primary PCI IDE Disabled** and **Onboard Secondary PCI IDE Disable**". When you plug the **PCI/ISA IDE** card into the system, You should **Disabled Onboard Primary and Secondary PCI IDE** from **CHIPSET FEATURES SETUP UTILITY** too.

When there is no paddle card and cable, you can set the system interrupt request (IRQ) on the "Legacy card" refer to user's manual of the card to a proper system IRQ level. (In general, card's Primary is assigned to **INTA** and Secondary is assigned to **INTB**. If the card is plugged into slot 1 marked **PCI#1**, you cannot use the second slot (marked **PCI#2**) because the Secondary **INT** signal takes **INTB** from the slot refer to Page 4-3 for circuit diagram. The user then enters **PCI CONFIGURATION SETUP** utility from **ROM SETUP UTILITY** main menu and sets the "**PCI IDE IRQ MAP TO PCI Slot 1**". It depends on the slot # where the Legacy card is plugged.)

Chapter 3

ATX Power Connector

Except for the AT power connector, the 5BTXB-E also equips with ATX power connector which is a single 20-PIN input device for ATX power supply (see Figure 3-3). To implement the built-in Remote ON/OFF function on ATX power supply, a momentary switch which is normally open should be connected to the position J5 as the system ON/OFF button. However, an AT power supply does not come with this function.

Based on the ATX power connector, the 5BTXB-E has been designed to support both ACPI and Soft OFF functions. According to the definition of ACPI, a Suspend mode will be enabled when you push the T5 system ON/OFF button less than 4 seconds. Nevertheless, the system will be turned off by pressing for more than 4 seconds. Regarding the Soft OFF coming from the 5BTXB-E onboard circuit controller, it's another way to turn off your system. Your system can be shut down automatically by an operation system such as Windows 95.

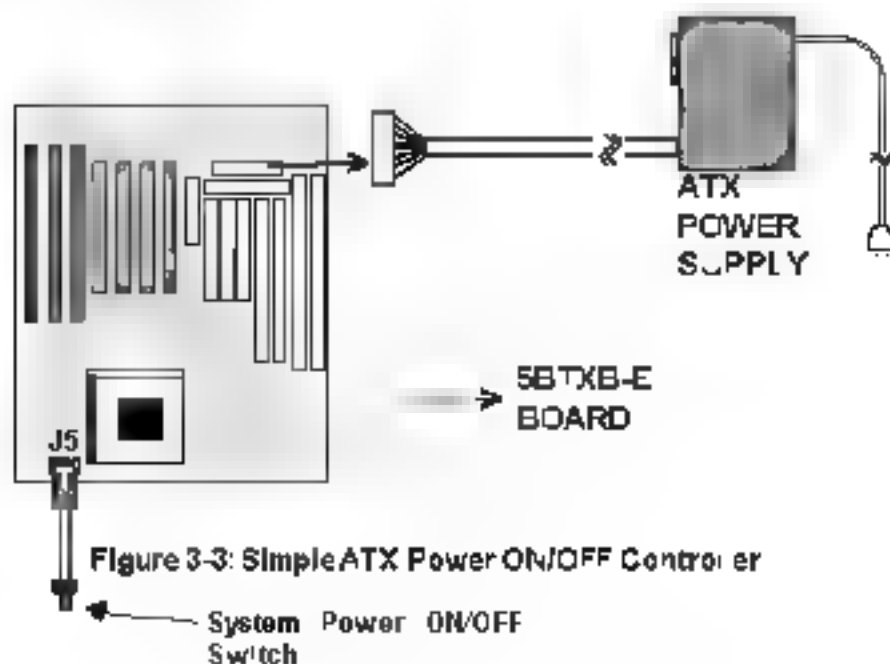


Figure 3-3: Simple ATX Power ON/OFF Controller

3-1 External Modem Ring-in Power ON

On the basis of bounded functions in I/O chipset, the two serial ports are able to support the External Modem Ring-in Power ON function. Once users connect the external modem to COM1 or COM2, the 5BTXB-E mainboard allows them to turn on their system through the remote and host's data port control. This function is available only under system being connected to ATX power supply.

How to work with it:

- Step 1** Please push the momentary switch „J5 button, to turn on your system and then push again to hold for more than 4 seconds to shut down as soon as you turn it on.
- Step 2** You connect the external modem to the mainboard's COM1 or COM2. When the external modem Ring-in to the system, the system will power ON instantly.

Chapter 4

Award BIOS Setup

Award's ROM BIOS provides a built-in Setup program which allows user to modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS RAM so data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM stay unchanged unless there is configuration change in the system, such as hard drive replacement or new equipment change.

It is possible that the CMOS battery is dead. This will cause data loss in CMOS RAM. If so, it is necessary to re-enter system configuration parameters.

To enter Setup Program

Power on the computer and press key immediately. This will bring you into BIOS CMOSSETUPUTILITY.

ROMPCISA BIOS(2A59IP49)			
CMOSSETUPUTILITY			
AWARDSOFTWARE,INC.			
STANDARD CMOS SETUP		SUPERVISOR PASSWORD	
BIOS FEATURES SETUP		USER PASSWORD	
CHIPSET FEATURES SETUP		IDE HDD AUTO DETECTION	
POWER MANAGEMENT SETUP		HDD LOW LEVEL FORMAT	
PNP/PCI CONFIGURATION		SAVE & EXIT SETUP	
INTEGRATED PERIPHERALS		EXIT WITHOUT SAVING	
LOAD SETUP DEFAULTS			
ESC: QUIT		↑ ↓ ← → SELECT ITEM	
F10: Save & Exit Setup		(Shift)F2: Change Color	
Time, Date, Hard Disk Type			

Figure 4.1 CMOS SETUP UTILITY

The menu displays all the major selection items and allows user to select any shown items. The selection is made by moving cursor, press any direction key, to the item and press Enter key. An on-line help message is displayed at the bottom of the screen as cursor is moving to various items which provides user better understanding of each function. When a selection is made, the menu of selected item will appear so the user can modify the associated configuration parameters.

4.1 Standard CMOS Setup

Choose "STANDARD CMOS SETUP" in the CMOS SETUP UTILITY Menu (Fig. 4.1). The STANDARD CMOS SETUP allows user to configure system setting such as current date and time, type of hard disk drive installed in the system, floppy drive type, and the type of display monitor. Memory size is auto-detected by the BIOS and displayed for your reference. When a field is highlighted, direction keys to move cursor and <Enter> key to select, the entries in the field will be changed by pressing <PgDn> or <PgUp> keys or user can enter new data directly from the keyboard.

ROM PCI/ISA BIOS(A591PA9) STANDARD CMOS SETUP AWARD SOFTWARE, INC.									
Date (mm/dd/yyyy) Wed, Apr 7 1996									
Time (hh:mm:ss) 14:30:30									
HARD DISKS	TYPE	SIZE	CYLs	HEAD	PRECOMP	LANDZONE	SECTORS	MODE	
Primary Master	Auto	0	0	0	0	0	0	Auto	
Primary Slave	Auto	0	0	0	0	0	0	Auto	
Secondary Master	Auto	0	0	0	0	0	0	Auto	
Secondary Slave	Auto	0	0	0	0	0	0	Auto	
Drive A		44M, 3.5in		Base Memory 640K Extended Memory 5360K Other Memory 384K ----- Total Memory 6384K					
Drive B		None							
Floppy 3 Mode Support		Disabled							
Video		EGA/VGA							
Halt On		All Errors							
ESC Quit		↑ + - ↓		Select Item		PGUP/PAGE Modify			
F1 Help		(Shift)F2		Change Color					

Figure 4.2 STANDARD CMOS SETUP

NOTE: If hard disk Primary Master/Slave and Secondary Master/Slave were used Auto, then the hard disk size and model will be auto-detected on display during POST.

NOTE: The "Halt On" field is to determine when to halt the system by the BIOS if error occurs during POST.

4.2 BIOS Features Setup

Selecting the "BIOS FEATURES SETUP" option in the CMOS SETUP UTILITY menu, allows user to change system related parameters in the displayed menu. This menu shows all of the manufacturer's default values of 5B7XCB-E. Again, user can move the cursor by pressing direction keys and <PgDn> or <PgUp> keys to modify the parameters. Pressing [F1] key to display help message of the selected item.

This setup program also provides 2 convenient ways to load the default parameter data from BIOS[F6] or CMOS[F7] area if shown data is corrupted. This provides the system a capability to recover from any possible error.

ROM PC/ISA BIOS(2A59P A9)					
BIOS FEATURES SETUP					
AWARD SOFTWARE, INC.					
Virus Warning	Disabled	Video BIOS	Shadow	Enabled	
CPU Internal Cache	Enabled	C8000-CBFFF	Shadow	Disabled	
External Cache	Enabled	CC000-CFFFF	Shadow	Disabled	
Quick Power-On Self Test	Enabled	DD000-D3FFF	Shadow	Disabled	
Boot Sequence	A, C, SCSI	D4000-D7FFF	Shadow	Disabled	
Swap Floppy Drive	Disabled	D8000-DBFFF	Shadow	Disabled	
Boot Up Floppy Seek	Enabled	DC000-DFFFF	Shadow	Disabled	
Boot Up NumLock Status	On				
Boot Up System Speed	High				
Gate A20 option	Fast				
Type matrix Rate Setting	Disabled				
Type matrix Rate (Chars/Sec)	6				
Type matrix Delay (Msec)	250				
Security Option	Setup				
PC/ISA Palette Snop	Disabled				
Assign IRQ For VGA	Enabled				
OS select For DRAM = 64MB	Non-OS2				
		Esc Quit ↑ ↓ ← → Select Item			
		F1 Help F10/PAUSE Modify			
		F5 Old Values Shift/F2 Color			
		F7 Load Setup Defaults			

Figure 4-3 BIOS FEATURES SETUP

Note The Security Option contains 'setup' and 'system'. The 'setup' indicates that the password setting is for CMOS only while the 'system' indicates the password setting is for both CMOS and system boot up procedure.

- ◆ **Virus Warning:** This category flashes on the screen. During and after the system boots up, any attempts to write to the boot sector or partition table of the hard disk drive will halt the system and an error message will appear. You should then run an anti-virus program to locate the virus. Keep in mind that this feature protects only the boot sector, not the entire hard drive. Default value is Disabled.

Enabled Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector.

Disabled No warning message to appear when anything attempts to access the boot sector.

Note Many disk diagnostic programs that access the boot sector table can trigger the virus warning message. If you plan to run such a program, we recommend that you first disable the virus warning.

- ◆ **CPU Internal Cache External Cache:** These two categories speed up memory access; however, it depends on CPU chipset design. The default value is Enabled. If your CPU is without Internal Cache, then this item "CPU Internal Cache" will not be shown.

Enabled Enable cache.

Disable Disable cache.

- ◆ **Quick Power On Self Test** This category speeds up Power On Self Test (POST) after you power on the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST. The default is Enable.
 - Enabled* Enable quick POST
 - Disabled* Normal POST
- ◆ **Boot Sequence:** This category determines which drive is searched first for the O/S Operating System. Default value is A, C, SCSI. The following is your list of options:
 - A, C, SCSI: C, A, SCSI: C, CDROM, A, [CDROM, C, A]: [D, A, CDROM]
 - E, A, CDROM: [F, A, CDROM: [SCSI, A, C]: [SCSI, C, A]: C Only]: [LS/ZIP, C]
 - A, C* System will first search for floppy disk drive then hard disk drive
 - C, A* System will first search for hard disk drive then floppy disk drive
 - CDROM, C, A* System will first search for the CDROM drive (If the CDROM has a bootable CD title and second search hard disk drive then floppy disk drive
 - C, CDROM, A* System will first search for the hard disk drive and second search the CDROM drive (If the CDROM has a bootable CD title then floppy disk drive
- ◆ **Swap Floppy Drive:** This will swap your physical drive letters A & B if you are using two floppy disks. Default value is Disabled.
 - Enabled* Floppy A & B are able to swap under DOS
 - Disabled:* Floppy A & B are not able to swap
- ◆ **Boot Up Floppy Seek:** During Power On Self Test (POST) BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. Only is 760K type 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks. The default value is Enable.
 - Enabled* BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Note that BIOS cannot tell from 720K, 1.2M or 1.44M drive type as they are all 80 tracks
 - Disabled* BIOS will not search for the type of floppy disk drive by track number. Note that there will not be any warning message if the drive installed is 460K
- ◆ **Boot Up NumLock Status:** Control the state of the Numlock key when the system boots. The default value is On.
 - On* Keypad's number keys
 - Off* Keypad is arrow keys
- ◆ **Boot UP System Speed:** Select High to boot at the default CPU speed, select Low to boot at the speed of the AT bus.
 - High* Set the speed to high
 - Low* Set the speed to low

- **Gate A20 Option** This refers to the way the system addresses memory above 1MB extended memory. The default value is Fast.
 - Normal* The A20 signal is controlled by keyboard controller or chipset hardware.
 - Fast* The A20 signal is controlled by Port 92 or chipset specific method.
- **Typematic Rate Setting:** This determines the keystroke repeat rate.
 - Enabled* Enable typematic rate and typematic delay programming.
 - Disabled:* Disable typematic rate and typematic delay programming. The rate will be controlled by keyboard controller in your system.
- **Typematic Rate(Chars/Sec):**

6 6 characters per second.	8 8 characters per second.
10 10 characters per second.	12 12 characters per second.
15 15 characters per second.	20 20 characters per second.
24 24 characters per second.	30 30 characters per second.
- **Typematic Delay(Msec):** When holding a key, the time between the first and second character displayed.
 - 250 250msec
 - 500 500 msec
 - 750 750 msec
 - 1000 1000 msec
- **Security Option:** This category allows you to limit access to the system and Setup or just to Setup. The default value is Setup.
 - System:* The system will not boot and the access to Setup will be denied if the correct password is not entered at the prompt.
 - Setup* The system will boot, but the access to Setup will be denied if the incorrect.
- **PCI/VGA Palette Snoop:** This allows the ability of a primary PCI VGA controller to share a common palette when a snoop write cycles with an ISA video card. The default value is Disabled.
 - Enabled:* If an ISA card connects to a PCI VGA card via the VESA connector and that ISA card connects to VGA monitor and that ISA card uses the RAMDAC of PCI card.
 - Disabled:* Disable the VGA card Palette snoop function.
- **Assign IRQ For VGA** The default value is Enabled.
 - Enabled* The system was assigned IRQ for VGA card.
 - Disabled* The system was not assigned IRQ for VGA card.

- **Video BIOS Shadow** It determines whether video BIOS will be copied to RAM, however it is optional from chipset design. Video Shadow will increase the video speed.

Enabled: Video shadow is enabled

Disabled: Video shadow is disabled

- **C8000 CFFFF Shadow**
- **CC000 CFFFF Shadow**
- **D0000 D3FFF Shadow**
- **D4000 D7FFF Shadow**
- **D8000 DBFFF Shadow**
- **DC000 DFFFF Shadow**

These categories determine whether other expansion card optional ROM will be copied to RAM by 6K byte or 32K byte per unit and the size depends on chipset. If you install other expansion cards with ROMs on them, you will need to know which addresses the ROMs use to shadow themselves specifically.

Enabled: Optional shadow is enabled

Disabled: Optional shadow is disabled

4.3 Chipset Features Setup

Choose the "CHIPSET FEATURES SETUP" in the CMOS SETUP UTILITY menu to display the following menu.

ROM PC/ISA BIOS(2A591FA9)		
CHIPSET FEATURES SETUP		
AWARD SOFTWARE, INC.		
Auto Configuration	Enabled	
DRAM Timing	60ns	
DRAM Loadoff Timing	0 6 3	
DRAM Write Buffer Timing	233	
Fast EDO Load Off	Enabled	
Refresh RAS# Assertion	4 Clks	
Fast RAS to CAS Delay	2	
DRAM Page Idle Timer	2 Clks	
DRAM Enhanced Paging	Enabled	
Fast MA to RAS# Delay	2 Clks	
SDRAM CAS Latency/RAS-to-CAS	2/2	
SDRAM Speculative Read	Disabled	
System BIOS Cacheable	Disabled	
Vitalon BIOS Cacheable	Enabled	
8-Bit IO Recovery Time	1	
16-Bit IO Recovery Time	2	
Memory HoleAt 3M-4M	Disabled	
PCI Compliance	Disabled	

ESC	Quit	↑ ↓ ← →	Select Item
F1	Help	F1/F2/F3	Modify
F5	Old Values	(Shift) F2	Color
F7	Load Setup Defaults		

Figure 4-4 CHIPSET FEATURES SETUP

- **Auto Configuration:** Selects predetermined optimal values of chipset parameters. When Disabled, chipset parameters revert to setup information stored in CMOS. Many fields in this screen are not available when Auto Configuration is Enabled.

Note: When you insert slow memory modules in the system and set a faster timing, the system may hang up.

- **DRAM Timing:** The default value is 60ns.
60ns 2 (faster Burst Wait State for 60-70ns Fast Page Mode/EDO DRAM)
70ns 3 (slower Burst Wait State for 70ns Fast Page Mode/EDO DRAM)
- **DRAM Leadoff Timing:** The default value is 10/6/3 (Read Leadoff/Write Leadoff/RAS# Precharge)
10/6/3 For EDO/FPM reads and Writes timing
11/7/3 For slow EDO/FPM reads and Writes timing
- **DRAM Writes Burst Timing:** The default value is x222
x222 For EDO/FPM of the fast burst mode timings
x333 For EDO/FPM of the slow burst mode timings
- **Fast EDO Lead off:** The default value is Enabled.
Enabled This field Enables fast timing EDO read cycles
Disabled Disables the fast timing EDO read cycles
- **Refresh RAS# Assertion:** The default value is 4 clks
4 This field controls the number of 4 clocks RAS# is asserted for Refresh
5 This field controls the number of 5 clocks RAS# is asserted for Refresh
- **Fast RAS To CAS Delay:** The default value is 2
2 This field controls a RAS# to CAS# delay is 2
3 This field controls a RAS# to CAS# delay is 3
- **Fast MA to RAS# Delay:** The default value is 2 Clks
1 Clks This field controls Memory Address to RAS's timing is 1 HCLKS
2 Clks This field controls Memory Address to RAS's timing is 1 HCLKS
- **SDRAM (CAS Lat./RAS-to-CAS):** The default value is 2/2
2/2 This field controls a RAS# to CAS# delay of 2 HCLKS is provided for SDRAM
3/3 This field controls a RAS# to CAS# delay of 3 HCLKS is provided for SDRAM
- **SDRAM Speculative Read:** The default value is Disabled.
Enabled Enables the SDRAM speculative read operation
Disabled Disables the SDRAM speculative read operation
- **System BIOS Cacheable:**
Enabled Allows caching of the system BIOS ROM at F0000h-FFFFFh resulting in better system performance. However, if any program writes to this memory area, a system error may result.
Disabled System BIOS non-cacheable.

- Video BIOS Cacheable:** The default value is enabled
Enabled: This field Enables the Video BIOS Cacheable to speed up the VGA Performance
Disabled: Disables the Video BIOS Cacheable function
- 8/16 Bit I/O Recovery Time:** The default value is 1
8 Bit I/O Recovery Time: This field defines the recovery time from 1 to 8 for 8-bit I/O
16 Bit I/O Recovery Time: To define the recovery time from 1 to 4 for 16-bit I/O
- Memory Hole at 15M-16M:** The default value is disabled
Disabled: Normal Setting
Enabled: This field enables the main memory 15-16MB remap to ISA BUS
 This feature reserves 15MB to 16MB memory address space to ISA expansion card that specifically require this setting
- PCI 2.1 Compliance:** The default value is Disabled
Enabled: This field Enables the PCI 2.1 Compliance timing
Disabled: Disables the PCI 2.1 timing

4.4 Power Management Setup

Choose the 'POWER MANAGEMENT SETUP' in the CMOS SETUP UTILITY to display the following screen. This menu allows user to modify the power management parameters and IRQ signals. In general, these parameters should not be changed unless it's absolutely necessary.

ROM PCI/ISA BIOS (2A59HPA9) POWER MANAGEMENT SETUP AWARD SOFTWARE, INC.			
Power Management	User Define	** Reload Global Timer Events **	
PM Control by APM	Yes	IRQ [3-7, 9-15], NM	Enabled
Video off Method	VH SYNC + Blank	Primary IDE 0	Disabled
Video off After	Standby	Primary IDE	Disabled
		Secondary IDE 0	Disabled
Doze Mode	Disable	Secondary IDE	Disabled
Standby Mode	Disabled	Floppy Disk	Disabled
Suspend Mode	Disabled	Serial Port	Disabled
HDD Power Down	5 Min	Parallel Port	Disabled
VGA Active Monitor	Enabled		
Soft-Off by PWB-BTN	Delay 4 sec		
Resume by Alarm	Disabled		
IRQ 8 Break Suspend Event	Disabled		
		ESC Quit	Select Item
		Help	Modify
		F5 Old Values	(Shift) F2 Color
		F7 Load Setup Defaults	

Figure 4-5 POWER MANAGEMENT SETUP

Again user can move the cursor by pressing direction keys to the field needed to be modified and press <PgDn> or <PgUp> to alter item selection. You can only change the content of Doze Mode, Standby Mode, and Suspend Mode when the Power Management is set to User Define.

Note: When the computer enters suspend mode (setting the suspend mode valid range from 1 minute up to 1 hour) activated by the BIOS power Management. You need to RUN a program POWER.EXE under DOS root, or need to add DEVICE=C:\DOS\POWER.EXF in your CONFIG.SYS. This will keep the system time updated normally when the system wake up from the suspend mode. The suspend mode for Windows[®] 95 or Windows[®] 3.1x has to install windows APM feature. Choose "Advanced Power Management" item from "system device". The "system device" field was from "system" icon in the "control panel."

4.4.1 The Description of the Power Management

A. Power Management mode selection

Disabled	The system operates in NORMAL conditions (Non-GREEN) and the Power Management function is disabled.
Max saving	Maximum power savings. Inactivity period is 30 minute in each mode.
Min. saving	Minimum power savings. Inactivity period is 1 minute in each mode.
User Define	Allows user to define PM Timers parameters to control power saving mode.

B. Time-out parameters

HDD Standby

The HDD Standby timer can be set from 5 to 15 minutes.

System Doze

The "System Doze" mode timer starts to count when no "PM event" occurs. The valid time-out setting is from 1 minute up to 1 hour.

System Standby

The "Standby" mode timer starts to count when the "System Doze" mode timer times out and no "PM events" occurred. The valid range is from 1 minute up to 1 hour.

System Suspend

This function works only when the Pentium[®] Processor is installed. The timer starts to count when the "System Standby" mode timer times out and no "PM Event" occurs. The valid range is from 1 minute up to 1 hour.

4.4.2 Description of the Green Functions

- **PMControl by APM:**

If Advanced Power Management (APM) is installed on your system, selecting Yes gives better power savings.

- **Video Off Method:** Determines the manner in which the monitor is blanked.

V/HSYNC+ Blank:

System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.

DPMISupport

Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied for your video subsystem to select video power management values.

Blank Screen

System only writes blanks to the video buffer.

- **Video off After:** Determines when to activate the video off feature for monitor power management. The settings are Video off after Suspend/standby/Doze (N/A).

- **Soft-off by PWR-BTIN:** This field is for the soft-off function setting. When the board utilizes an ATX power supply, two types of settings are offered: *Delay 4 Sec.* and *Instant-Off*. When the setting is *Delay 4 Sec.*, users can power off the system by pressing J5 for 4 seconds. However, if users press J5 for less than 4 seconds, the system will enter the Suspend Mode. When the setting is *Instant Off*, users' first press on J5 will power off the system, but the second press will power on the system.

- **Resume by Alarm:** This option allows you to have the system turn on at a preset time each day or on a certain day. This option is only available when used an ATX power supply.

The default is Disabled.

Enabled: The system will turn on at the preset time.

Disabled: The system will not turn on until you turn it on.

- **Date(of month) Alarm:** This is how you set the date that the system will turn on.

The default is 0.

0: Setting this to 0 will turn the system on everyday at the preset time.

1-31: Represents the day of the month that you need the system to turn on.

- **Time(hh:mm:ss) Alarm:** This sets the time that you need the system to turn on.

The default is 08:00:00.

HDDPowerDown

When the system stops reading or writing HDD, the timer starts to count. The system will cut off the HDD power when timer runs out of time. The system will not resume operation until a read from or a write to HDD command is executed again.

DozeMode

The system hardware will drop down CPU clock from normal working speed when Doze mode timeout occurs.

StandbyMode

When the system standby mode timer runs out, it will enter the standby mode and retain CPU at its own working speed. The screen will be blanked out.

SuspendMode

When the system suspend timer times out, the system will enter the suspend mode and the chipset will stop CPU clock immediately. The power consumption in Suspend Mode is lower than in standby mode. The screen is also blanked out.

PMEvents:

AWARD BIOS defines Read Global Timer Events in the power management mode (Doze, standby & suspend). The user can initialize any PM Events to be "Enabled" or "Disabled". When the system detects all of the enabled events which do not have any activity, it will start the system Doze timer first. If the "Power Management" isn't "Disabled". Once the system Doze timer timed out, it will process doze power saving procedure by starting the system standby timer. When the standby timer ran out and all of the "Enabled" events remains silent, the system will enter the standby mode. By now, the system will not only process the standby power saving procedures but also start the system suspend timer. When the suspend timer times out, all of the CPU clock will stop by dropping system clock down to zero and remains this way until any one of the "Enabled" event occurs.

4.5 PnP/PCI Configuration

The PnP/PCI configuration program is for the user to modify the PCI/ISA IRQ signals when various PCI/ISA cards are inserted in the PCI or ISA slots.

WARNING Any mispicking IRQ could cause system cannot pick up the resources.

ROM PC/ISA BIOS (2A59CPA9)			
PNP/PCI CONFIGURATION			
AWARD SOFTWARE, INC.			
PNP OS installed	NO	PCI/IDE IRQ Map To	PCI-AUTO
Resources Controlled By	Manual	Primary(IDE)INT#	A
Reset Configuration Data	Disabled	Secondary(IDE)INT#	B
IRQ-9 assigned to	Legacy ISA	Used MEM base addr	N/A
IRQ-4 assigned to	Legacy ISA	Assign IRQ For USB	Enabled
IRQ-5 assigned to	PC/ISA PnP		
IRQ-7 assigned to	PC/ISA PnP		
IRQ-9 assigned to	PC/ISA PnP		
IRQ-0 assigned to	PC/ISA PnP		
IRQ-1 assigned to	PC/ISA PnP		
IRQ-2 assigned to	PC/ISA PnP		
IRQ-3 assigned to	PC/ISA PnP		
IRQ-4 assigned to	PC/ISA PnP		
IRQ-5 assigned to	PC/ISA PnP		
DMA-0 assigned to	PC/ISA PnP		
DMA-1 assigned to	PC/ISA PnP		
DMA-2 assigned to	PC/ISA PnP		
DMA-3 assigned to	PC/ISA PnP		
DMA-4 assigned to	PC/ISA PnP		
DMA-5 assigned to	PC/ISA PnP		
DMA-6 assigned to	PC/ISA PnP		
DMA-7 assigned to	PC/ISA PnP		
		ESC Quit	Select Item
		F1 Help	PC/PD/++ Modify
		F5 Old Values	(Shift) F2 Color
		F7 Load Setup Defaults	

Figure 4-6 PCI CONFIGURATION SETUP

- **PNP OS INSTALLED** Do you have a PNP OS installed on your system

The default is NO

Yes Select if you are using a PNP OS and using PNP card.

NO Select if your OS does not support PNP

- **Resource Controlled By** The default value is Manual

Manual PNP Card's resources will be controlled manually. You can set which IRQ X and DMA X are assigned to PC/ISA PnP or Legacy ISA Cards

Auto If your ISA card and PCI card are all PNP cards, BIOS will assign the interrupt resource automatically

- **Reset Configuration Data** The default value is disabled.

Disabled Normal Setting

Enabled If you had plugged some Legacy cards in the system and recorded into ESCD(Extended System Configuration Data), you can set this field to enabled to clear ESCD

- **PCI/IDE IRQ Map To** The default value is PCI-AUTO

When you have true PCI cards plugged into the system, you will not need to change anything here in the **SETUP** program. However if you do not know whether you have true PCI card or not, please refer to your PCI card user's manual for the details.

When you have a legacy card described in section 2-6 to be plugged into the system, a proper setting is extremely important or it may cause the system hang. The diagram shown below tells you how the Rotating Priority Mechanism is designed.

- **Used MEM base addr and Used MEM Length** The default value is N.A.

The Used MEM base addr (CB00, CC00, D000, D400, D800, DC00) and Used MEM Length (8K, 16K, 32K, 64K) support some specific ISA Legacy cards with requested memory space below M address. Now with these two functions, users can define where the used memory address is located and its length of the legacy area corresponding. Based on these, BIOS will skip the UMB area that is used by the legacy device to avoid the memory space conflict. For example, if users select 'D000' for 'Used MEM base addr' and '16K' for 'Used MEM Length', that means the address region D0000H-D1FFFH is occupied by ISA legacy cards, and thus BIOS will not assign this region for PnP ISA and PCI cards.

- **Assign IRQ For USB:** The default value is Enabled

Enabled The system was assigned IRQ for USB port
Disabled The system was not assigned IRQ for USB port

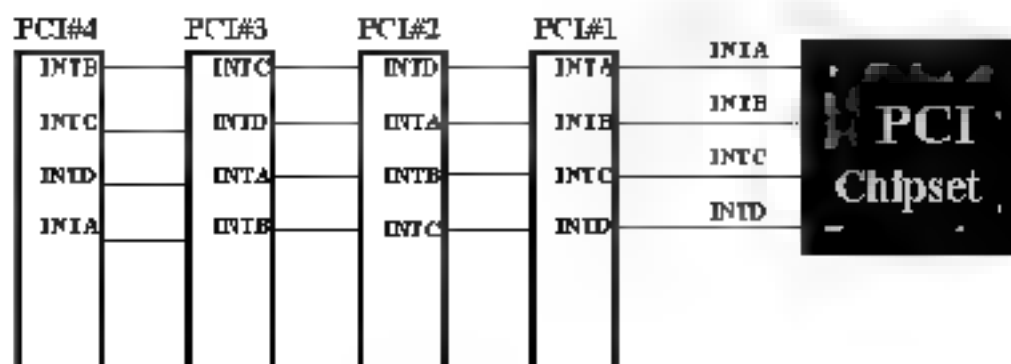


Figure 4-7 The Combination of PCI INT# lines

4-6 Integrated Peripherals

ROM PCI/ISA BIOS(24591PA9) INTEGRATED PERIPHERALS WARD SOFTWARE, INC.			
IDE HDD Block Mode	Enabled	Onboard Parallel Mode	ECP EPP
IDE Primary Master PIO	Auto	ECP Mode vs DMA	3
IDE Primary Slave PIO	Auto	Parallel Port EPP Type	EPP 9
IDE Secondary Master PIO	Auto		
IDE Secondary Slave PIO	Auto		
IDE Primary Master UDMA	Auto		
IDE Primary Slave UDMA	Auto		
IDE Secondary Master UDMA	Auto		
IDE Secondary Slave UDMA	Auto		
Onboard Primary PCI IDE	Enabled		
Onboard Secondary PCI IDE	Enabled		
USB Keyboard Support	Disabled		
Onboard FDD Controller	Enabled		
Onboard Serial Port	Auto	ESC Quit	↑ ↓ ← → Select item
Onboard Serial Port 2	Auto	F1 Help	PG/PD/+/+ Modify
UART 2 Mode	Standard	F5 Old Values	(Shift) F2 Color
Onboard Parallel Port	378/IRQ7	F7 Load Setup Defaults	

Note. If you don't use the Onboard IDE connector than use On-card (PCI or ISA card) IDE connector You will set Onboard Primary PCI IDE Disabled and Onboard Secondary PCI IDE Disabled from CHIPSET FEATURES SETUP UTILITY

The Onboard PCI IDE cable should be equal to or less than 18 inches 45 cm.).

- **IDE HDD Block Mode** Select enabled only if your hard drives support block mode
Enabled Enabled IDE HDD Block Mode Provides higher HDD transfer rates
Disabled Disable IDE HDD Block Mode
- **IDE Primary (Secondary) Master/Slave PIO** The default value is Auto
This field is Selectable Primary (Secondary) IDE PIO Mode '0-4' for HDD
- **IDE Primary (Secondary) Master/Slave UDMA** The default value is Auto
Auto Select Primary (Secondary) IDE used UltraDMA HDD
Disabled Disabled Primary (Secondary) IDE used Ultra DMA HDD
- **Onboard Primary PCI IDE** The default value is enabled
Enabled Enable Onboard 1st channel IDE port
Disabled Disable Onboard 1st channel IDE port when using On-card (PCI or ISA card) IDE connector
- **Onboard Secondary PCI IDE** The default value is enabled
Enabled Enable Onboard 2nd channel IDE port
Disabled Disable Onboard 2nd channel IDE port when using On-card (PCI or ISA card) IDE connector

- **IDE Primary Master PIO** The default value is Auto
 - Auto* BIOS will automatically detect the Onboard Primary Master PCI IDE HDD Accessing mode
 - Mode0-4* Manually set the IDE Accessing mode
- **IDE Primary Slave PIO** The default value is Auto
 - Auto* BIOS will automatically detect the Onboard Primary Slave PCI IDE HDD Accessing mode
 - Mode0-4* Manually set the IDE Accessing mode
- **IDE Secondary Master PIO** The default value is Auto
 - Auto* BIOS will automatically detect the Onboard Secondary Master PCI IDE HDD Accessing mode
 - Mode0-4* Manually set the IDE Accessing mode
- **IDE Secondary Slave PIO** The default value is Auto
 - Auto* BIOS will automatically detect the Onboard Secondary Slave PCI IDE HDD Accessing mode
 - Mode0-4* Manually set the IDE Accessing mode
- **Onboard FDC Controller** The default value is Enabled
 - Enabled* Enable the Onboard SMC CHIP's floppy drive interface controller
 - Disabled* Disable the Onboard SMC CHIP's floppy drive interface controller when using On-card ISA FDC's controller
- **Onboard UART 1** This field allows the user to select the serial port. The default value is 3F8H/IRQ4
 - COM1* Enable Onboard Serial port 1 and address is 3F8H/IRQ4
 - COM2* Enable Onboard Serial port 1 and address is 2F8H/IRQ3
 - COM3* Enable Onboard Serial port 1 and address is 3E8H/IRQ4
 - COM4* Enable Onboard Serial port 1 and address is 2E8H/IRQ3
 - Disabled* Disable Onboard SMC CHIP's Serial port
- **Onboard UART 2** This field allows the user to select the serial port. The default value is 2F8H/IRQ3
 - COM1* Enable Onboard Serial port 2 and address is 3F8H/IRQ4
 - COM2* Enable Onboard Serial port 2 and address is 2F8H/IRQ3
 - COM3* Enable Onboard Serial port 2 and address is 3E8H/IRQ4
 - COM4* Enable Onboard Serial port 2 and address is 2E8H/IRQ3
 - Disabled* Disable Onboard SMC CHIP's Serial port 2

- ◆ **Onboard UART 2 Mode:** The default value is standard. This field allows the user to select the COM2 port that can support a serial Infrared Interface.

standard: Support a Serial Infrared Interface IrDA.

HPSIR: Support a HP Serial Infrared Interface formats.

ASKIR: Support a Sharp Serial Infrared Interface formats.

- ◆ **Onboard Parallel port:** This field allows the user to select the LPT port. The default value is 378H/IRQ7.

378H Enable Onboard LPT port and address is 378H and IRQ7.

278H Enable Onboard LPT port and address is 278H and IRQ5.

3BCH Enable Onboard LPT port and address is 3BCH and IRQ7.

Disabled Disable Onboard SMC CHIP's LPT port.

NOTE: Parallel Port address is 378H/3BCH that selects the routing of IRQ7 for LPT1.

Parallel Port address is 278H that selects the routing of IRQ5 for LPT1.

- ◆ **Parallel port Mode:** This field allows the user to select the parallel port mode. The default value is ECP+EPP.

Normal Standard mode IBM PC/AT Compatible bidirectional parallel port.

EPP Enhanced Parallel Port mode.

ECP Extended Capabilities Port mode.

EPP+ECP ECP Mode & EPP Mode.

ECP Mode USE DMA: This field allows the user to select DMA1 or DMA3 for the ECP mode. The default value is DMA3.

DMA1 The field selects the routing of DMA1 for the ECP mode.

DMA3 The field selects the routing of DMA3 for the ECP mode.

4.7 Load Setup Defaults

The 'LOAD SETUP DEFAULTS' function loads the system default data directly from ROM and initializes the associated hardware properly. This function will be necessary only when the system CMOS data is corrupted.

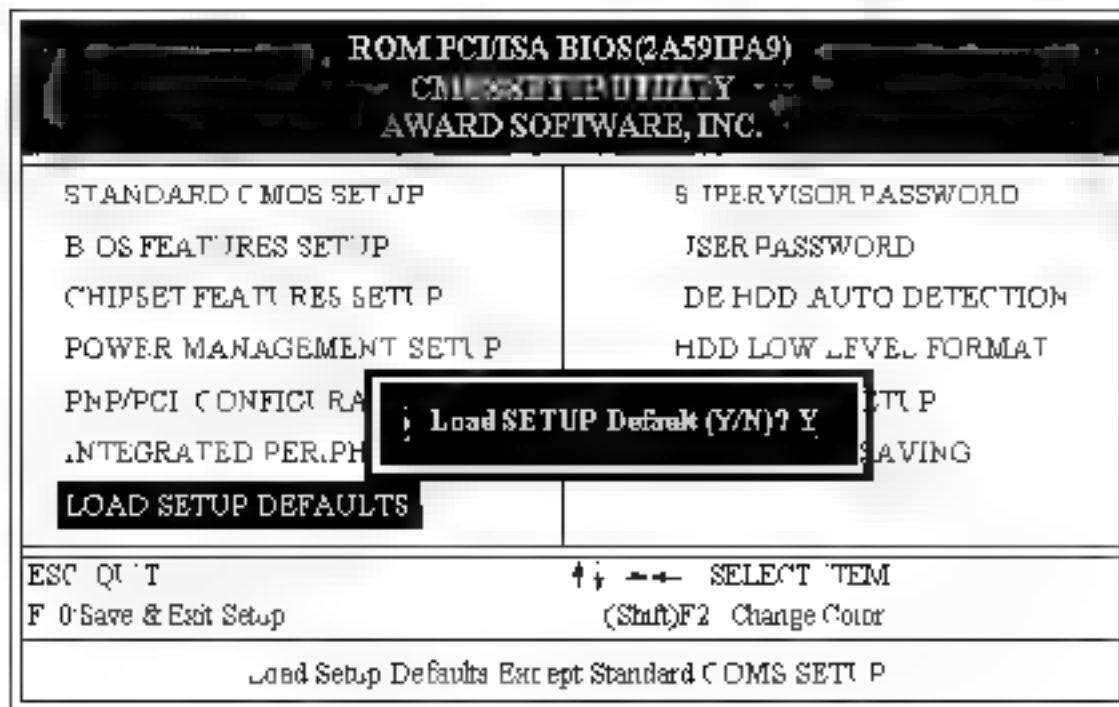


Figure 4-8 LOAD SETUP DEFAULT

4-8 Change Supervisor or User Password

To change the password, choose the "SUPERVISOR PASSWORD" or "USER PASSWORD" option from the CMOS SETUP UTILITY menu and press [Enter].

NOTE Either "Setup" or "System" must be selected in the "Security Option" of the BIOS FEATURES SETUP menu (Refer to Figure 4-3 for the details).

1. If CMOS is corrupted or the option was not used, a default password stored in the ROM will be used. The screen will display the following message:

Enter Password:

Press the [Enter] key to continue after proper password is given.

2. If CMOS is corrupted or the option was used earlier and the user wish to change default password the SETUP UTILITY will display a message and ask for a confirmation:

Confirm Password:

3. After pressing the [Enter] key (ROM password if the option was not used or current password user defined password) the user can change the password and store the new one in CMOS RAM. A maximum of 8 characters is acceptable.

4.9 IDE HDD Auto Detection

The 'IDE HDD AUTO DETECTION' utility is a very useful tool especially when you do not know which kind of hard disk type you are using. You can use this utility to detect the correct disk type installed in the system automatically. But now you can set **HARD DISK TYPE** to **Auto** in the **STANDARD CMOS SETUP**. You don't need the 'IDE HDD AUTO DETECTION' utility. The BIOS will Auto detect the hard disk size and model on display during POST.

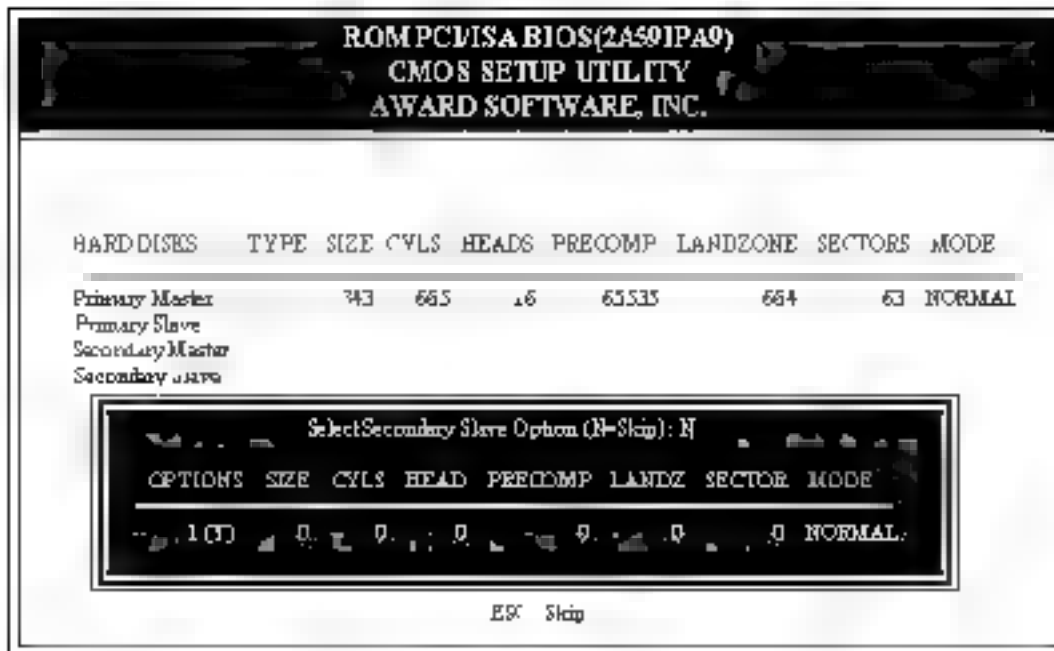


Figure 4.9 IDE HDD AUTO DETECTION

NOTE HDDModes

The Award BIOS supports 3 HDD modes: NORMAL, LBA & LARGE.

NORMAL mode

Generic access mode in which neither the BIOS nor the IDE controller will make any transformations during accessing.

The maximum number of cylinders, heads and sectors for NORMAL mode are 1024, 6 and 63.

no Cylinder	1024
* no Head	16)
* no Sector	63)
<u>* no. per sector</u>	<u>512)</u>
528 Megabytes	

If users set his HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes even though its physical size may be greater than that.

LBA (Logical Block Addressing mode)

A new HDD accessing method to overcome the 528 Megabyte bottleneck. The number of cylinders, heads and sectors shown in the setup may not be the number physically contained in the HDD.

During HDD accessing, the IDE controller will transform the logical address described by sector, head and cylinder into its own physical address inside the HDD.

The maximum HDD size supported by LBA mode is 8.4 GigaBytes which is obtained by the following formula.

$$\begin{array}{rcl}
 & \text{no Cylinder} & 024 \\
 \times & \text{no Head} & 255 \\
 \times & \text{no Sector} & 63 \\
 \hline
 \times & \text{bytes per sector} & 512 \\
 & \text{8.4 GigaBytes} &
 \end{array}$$

LARGE mode

Extended HDD access mode is supported by Award Software.

Some IDE HDDs contain more than 1024 cylinder without LBA support. In some cases, users do not want the LBA mode. The Award BIOS provides another alternative to support these kinds of LARGE mode.

CYLs	HEADS	SECTOR	MODE
20	16	59	NORMAL
560	32	59	LARGE

BIOS tracks DOS or other OS that the number of cylinders is less than 1024 by dividing it by 2. At the same time, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT 13h in order to access the right HDD address.

Maximum HDD size

$$\begin{array}{rcl}
 & \text{no Cylinder} & 024 \\
 \times & \text{no Head} & 32 \\
 \times & \text{no Sector} & 63 \\
 \hline
 \times & \text{bytes per sector} & 512 \\
 & 1 GigaBytes &
 \end{array}$$

Note

To support LBA or LARGE mode of HDDs, there must be some softwares involved. As these softwares are located in the Award HDD Service Routine (INT 13h), it may be failed to access a HDD with LBA (LARGE mode selected if you are running under a Operating System which replaces the whole INT 13h. UNIX operating systems do not support either LBA or LARGE and must utilize the Standard mode. However UNIX can support drives larger than 528MB.

4-10 HDD Low Level Format

Interleave

Select the interleave number of the hard disk drive you wish to perform low level format. You may select from 1 to 8. Check the documentation that came with the drive for the correct interleave number or select 0 for automatic detection.

Auto scan bad track

This allows the utility to scan first then format by each track.

Start

Press <Y> to start low level format.

4-11 Save & Exit Setup

The 'SAVE & EXIT SETUP' option will bring you back to boot up procedure with all the changes you just made which are recorded in the CMOS RAM.

4-12 Exit Without Saving

The 'EXIT WITHOUT SAVING' option will bring you back to normal boot up procedure without saving any data into CMOS RAM. All of the old data in the CMOS will not be updated.

Chapter 5

Technical Information

5.1 I/O & MEMORY MAP

MEMORYMAP

Address Range	Size	Description
[00000-7FFFF]	5.2K	Conventional memory
[80000-9FBFF]	1.27K	Extended Conventional memory
[9FC00-9FFFF]	1K	Extended BIOS data area if PS/2 mouse is installed
[A0000-C7FFF]	1.60K	Available for Hi-DOS memory
[C8000-DEFFF]	96K	Available for Hi-DOS memory and adapter ROMs
[E0000-EEFFF]	60K	Available for UMB
[EF000-FFFFF]	4K	Video service routine for Monochrome & CGA adapter
[F0000-F7FFF]	32K	BIOS CMOS setup utility
[F8000-FCFFF]	20K	BIOS runtime service routine (2)
[FD000-FDFFF]	4K	Plug and Play ESCD data area
[FE000-FFFFF]	8K	BIOS runtime service routine (1)

I/O MAP

[000-01F]	DMA controller (Master)
[020-021]	INTERRUPT CONTROLLER (Master)
[022-023]	CHIPSET control registers I/O ports
[040-05F]	TIMER control registers
[060-06F]	KEYBOARD interface controller (8042)
[070-07F]	RTC ports & CMOS I/O ports
[080-09F]	DMA register
[0A0-0BF]	INTERRUPT controller (Slave)
[0C0-0DF]	DMA controller (Slave)
[0F0-0FF]	MATH COPROCESSOR
[1F0-1F3]	HARD DISK controller
[278-27F]	PARALLEL port 2
[2B0-2DF]	GRAPHICS adapter controller
[2F8-2FF]	SERIAL port 2
[360-36F]	NETWORK ports
[378-37F]	PARALLEL port 1
[3B0-3BF]	MONOCHROME & PARALLEL port adapter
[3C0-3CF]	EGA adapter
[3D0-3DF]	CGA adapter
[3F0-3F7]	FLOPPY DISK controller
[3F8-3FF]	SERIAL port 1

5-2 Time & DMA Channels Map

TIME MAP	TIMER Channel 0	System timer interrupt
	TIMER Channel 1	DRAM REFRESH request
	TIMER Channel 2	SPEAKER tone generator
DMA CHANNELS	DMA Channel 0	Available
	DMA Channel 1	Onboard ECP (Option)
	DMA Channel 2	FLOPPY DISK (SMC CHIP)
	DMA Channel 3	Onboard ECP default
	DMA Channel 4	Cascade for DMA controller 1
	DMA Channel 5	Available
	DMA Channel 6	Available
	DMA Channel 7	Available

5-3 Interrupt Map

NMI	Parity check error	
IRQ (H/W)	0	System TIME R interrupt from TIMER 0
	1	KEYBOARD output buffer full
	2	Cascade for IRQ 8-15
	3	SERIAL port 2
	4	SERIAL port
	5	PARALLEL port 2
	6	FLOPPY DISK (SMC CHIP)
	7	PARALLEL port 1
	8	RTC clock
	9	Available
	10	Available
	11	Available
	12	PS/2 Mouse
	13	MATH coprocessor
	14	Onboard HARD DISK (IDE channel
	15	Onboard HARD DISK (IDE2 channel

5-4 RTC & CMOS RAM Map

RTC & CMOS:	00	Seconds
	01	Second alarm
	02	Minutes
	03	Minutes alarm
	04	Hours
	05	Hours alarm
	06	Day of week
	07	Day of month
	08	Month
	09	Year
	0A	Status register A
	0B	Status register B
	0C	Status register C
	0D	Status register D
	0E	Diagnostic status byte
	0F	Shutdown byte
	10	FLOPPY DISK drive type byte
	11	Reserve
	12	HARD DISK type byte
	13	Reserve
	14	Equipment type
	15	Base memory low byte
	16	Base memory high byte
	17	Extension memory low byte
	18	Extension memory high byte
	19-1D	
	2E-2F	
	30	Reserved for extension memory low byte
	31	Reserved for extension memory high byte
	32	DATE CENTURY byte
	33	INFORMATION FLAG
	35-3F	Reserved
	40-7F	Reserved for CHIPSET SETTING DATA

Appendix A POST Codes

ISA POST codes are typically output to port address 80h.

POST(hex) DESCRIPTION

01-02	Reserved
C0	Turn off OEM specific cache shadow
03	Initialize EISA registers (EISA BIOS only) 2 Initialize all the standard devices with default values. Standard devices includes: DMA controller (8237) Programmable Interrupt Controller (8259) Programmable Interval Timer (8254) RTC chip
04	Reserved
05	Keyboard Controller Self-Test 2 Enable Keyboard interface
06	Reserved
07	Verifies CMOS's basic R/W functionality
C1	Auto-detection of onboard DRAM & Cache
C5	Copy the BIOS from ROM into F0000-FFFFF shadow RAM so that POST will go faster
08	Test the first 256K DRAM
09	OEM specific cache initialization (if needed)
0A	Initialize the first 32 interrupt vectors with corresponding Interrupt handlers Initialize INT no from 33-120 with Dummy (Supervisor) interrupt Handler 2 Issue CPUID instruction to identify CPU type 3 Early Power Management initialization (OEM specific)
0B	Verify the RTC time is valid or not 2 Detect bad battery 3 Read CMOS data into BIOS stack area 4 PnP initializations including (PnP BIOS only) Assign CSN to PnP ISA card Create resource map from ESCD 5 Assign I/O & Memory for PC devices (PCI BIOS only)

POST(hex) DESCRIPTION

0C	Initialization of the BIOS Data Area (40:00 - 40:FF)
0D	<p>Program some of the Chipset's value according to Setup (Early Setup Value Program)</p> <p>2 Measure CPU speed for display and decide the system clock speed</p> <p>3 Video initialization including Monochrome, CGA and EGA/VGA. If no display device found, the speaker will beep up</p>
0E	<p>Test video RAM. If Monochrome display device found</p> <p>2 Show messages including</p> <p style="padding-left: 40px;">Award Logo, Copyright string, BIOS Data code & Part No</p> <p style="padding-left: 40px;">OEM specific sign on messages</p> <p style="padding-left: 40px;">Energy Star Logo (Green BIOS ONLY)</p> <p style="padding-left: 40px;">CPU brand, type & speed</p> <p style="padding-left: 40px;">Test system BIOS checksum (Non-Compress Version only)</p>
0F	DMA channel 0 test
10	DMA channel 1 test
11	DMA page registers test
12-13	Reserved.
14	Test 8254 Timer 0 Counter 2
15	Test 8259 interrupt mask bits for channel 1
16	Test 8259 interrupt mask bits for channel 2
17	Reserved.
19	Test 8259 functionality
1A-1D	Reserved.
1E	If EISA NVMM checksum is good, execute EISA initialization (EISA BIOS only)
1F-29	Reserved.
30	Detect Base Memory & Extended Memory Size
31	<p>Test Base Memory from 256K to 640K</p> <p>2 Test Extended Memory from 1M to the top of memory</p>

POST(hex) DESCRIPTION

32	1. Display the Award Plug & Play BIOS Extension message (PnP BIOS only) 2. Program all onboard super I/O chips if any including COM ports, LPT ports, FDD port according to setup value
33-3B	Reserved
3C	Set flag to allow users to enter CMOS Setup Utility
3D	1. initialize Keyboard 2. install PS/2 mouse
3E	Try to turn on Level 2 cache Note: Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST d.h.
3F-40	Reserved
4F	1. Program the rest of the Chipset's value according to Setup (Later Setup Value Program) 2. If auto-configuration is enabled, programmed the chipset with pre-defined Values
41	Initialize floppy disk drive controller
42	Initialize Hard drive controller
43	If it is a PnP BIOS, initialize serial and parallel ports
44	Reserved
45	Initialize math coprocessor
46-4D	Reserved
4E	If there's any error detected such as video, kb, show all the error messages on the screen and wait for user to press <F> key
4F	1. If password is needed, ask for password 2. Clear the Energy Star Logo (Green BIOS only)
50	Write all CMOS values currently in the BIOS stack area back into the CMOS
51	Reserved

POST(hex) DESCRIPTION

- 52**
- 1 Initialize all ISA ROMs
 - 2 Later PC initializations (PC BIOS only)
 - Assign IRQ to PC devices
 - Initialize all PCI ROMs
 - 3 PnP Initializations (PnP BIOS only)
 - Assign I/O Memory IRQ & DMA to PnP ISA devices
 - Initialize all PnP ISA ROMs
 - 4 Program shadows RAM according to Setup settings
 - 5 Program parity according to Setup setting
 - 6 Power Management initialization
 - Enable/Disable global PM
 - APM interface initialization
- 53**
- 1 If it is NOT a PnP BIOS, initialize serial and parallel ports
 - 2 Initialize time value in BIOS data area by translate the RTC time value into a timer tick value
- 60** Setup Virus Protection (Boot Sector Protection, functionality according to Setup setting)
- 61**
- 1 Try to turn on Level 2 cache
 - Note: if L2 cache is already turned on in POST 3D this part will be skipped
 - 2 Set the boot up speed according to Setup setting
 - 3 Last chance for Chipset initialization
 - 4 Last chance for Power Management initialization (Green BIOS only)
 - 5 Show the system configuration table
- 62**
- 1 Setup daylight saving according to Setup value
 - 2 Program the NMI Lock, typematic rate & typematic speed according to Setup setting
- 63**
- 1 If there is any changes in the hardware configuration, update the ESCD information (PnP BIOS only)
 - 2 Clear memory that have been used
 - 3 Boot system via INT 19H
- FF** System Booting. This means that the BIOS already past the control right to the operating system

UnexpectedErrors:**POST(hex) DESCRIPTION**

- 80** If interrupt occurs in protected mode
- 81** Unclaimed NMI occurs

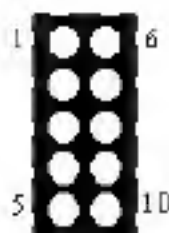
Appendix B: I/O Connectors

J1 : PS/2 Mouse Connector:



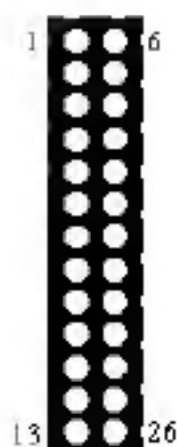
Pin	Signal Name
1	Data (Red Wire)
2	Clock (Blue Wire)
3	GND (Green Wire)
4	NC
5	VCC (Yellow Wire)

COM1, COM2 : Serial Ports Connector

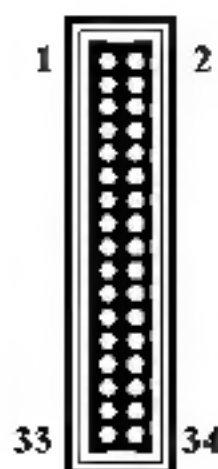


Signal Name	Pin	Pin	Signal Name
DCD	1	6	DSR
SIN	2	7	RTS
SOUT	3	8	CTS
DTR	4	9	RI
GND	5	10	NC

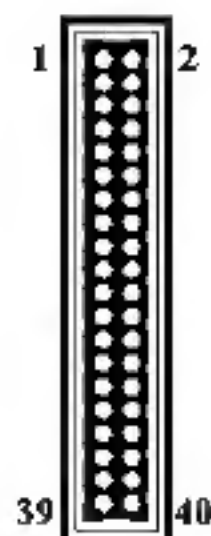
LPT1 : Parallel Port Connector



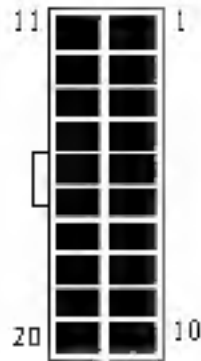
Signal Name	Pin	Pin	Signal Name
STROBE-	1	14	AUTO FEED-
Data Bit 0	2	15	ERROR-
Data Bit 1	3	16	INIT-
Data Bit 2	4	17	SLCT IN-
Data Bit 3	5	18	Ground
Data Bit 4	6	19	Ground
Data Bit 5	7	20	Ground
Data Bit 6	8	21	Ground
Data Bit 7	9	22	Ground
ACJ-	10	23	Ground
BUSY	11	24	Ground
PE	12	25	Ground
SLCT	13	26	NC

FDD1 : Floppy Disk Connector

Signal Name	Pin	Pin	Signal Name
Ground	1	2	FDHDI
Ground	3	4	Reserved
Ground	5	6	FDEDI
Ground	7	8	Index-
Ground	9	10	Motor Enable
Ground	11	12	Drive Select B-
Ground	13	14	Drive Select A-
Ground	15	16	Motor Enable
Ground	17	18	DIR-
Ground	19	20	STEP-
Ground	21	22	Write Data
Ground	23	24	Write Gate
Ground	25	26	Track 00-
Ground	27	28	Write Protect-
Ground	29	30	Read Data-
Ground	31	32	SIDE 1 SELECT-
Ground	33	34	Diskette

IDE1/IDE2 : Primary, Secondary IDE Connector

Signal Name	Pin	Pin	Signal Name
Reset IDE	1	2	Ground
Host Data 7	3	4	Host Data 8
Host Data 6	5	6	Host Data 9
Host Data 5	7	8	Host Data 10
Host Data 4	9	10	Host Data 11
Host Data 3	11	12	Host Data 12
Host Data 2	13	14	Host Data 13
Host Data 1	15	16	Host Data 14
Host Data 0	17	18	Host Data 15
Ground	19	20	Key
DRQ3	21	22	Ground
I/O Write-	23	24	Ground
I/O Read-	25	26	Ground
IOCHRDY	27	28	BALE
DACK3-	29	30	Ground
IRQ14	31	32	IOCS16-
Addr 1	33	34	Ground
Addr 0	35	36	Addr 2
Chip Select 0-	37	38	Chip Select 1-
Activity	39	40	Ground

PW2: ATX Power Supply Connector

Signal Name	Pin	Pin	Signal Name
3.3V	11	1	3.3V
-12.0V	12	2	3.3V
GND	13	3	GND
PS-ON	14	4	5.0V
GND	15	5	GND
GND	16	6	5.0V
GND	17	7	GND
-5.0V	18	8	PW-OK
5.0V	19	9	5VSB
5.0V	20	10	12.0V

CN1: USB Header

Signal Name	Pin	Pin	Signal Name
+5V	1	2	GND
USBP0-	3	4	GND
USBP0+	5	6	GND
GND	7	8	GND
+5V	9	10	GND
USBP1-	11	12	GND
USBP1+	13	14	GND
GND	15	16	GND

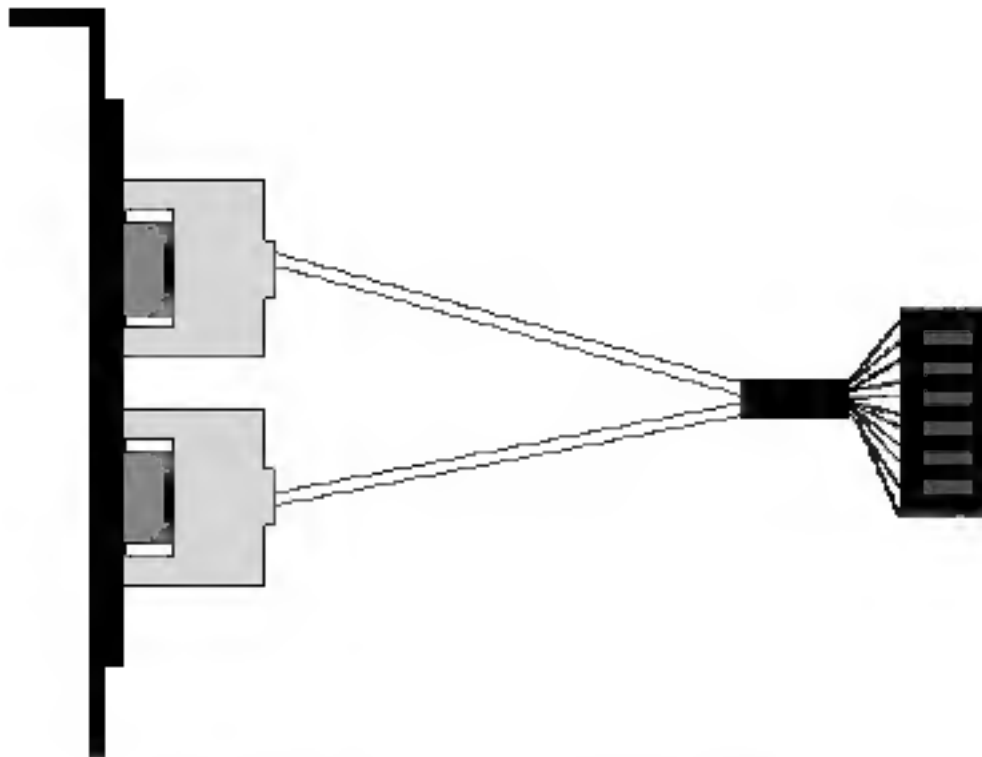


Figure 5-1 USB Port Cable (Option)